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EXAMINER	
LIU, XUE H	

ART UNIT	PAPER NUMBER
1742	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/590,316	KAMMERMEIER ET AL	
	Examiner	Art Unit	
	XUE LIU	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 November 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *18-81* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *18-81* is/are rejected.

7)☒ Claim(s) *2* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Amendment to claims filed 11/8/10 is acknowledged. Currently, claims 18-81 are pending. Claims 34 and 38 remain withdrawn from consideration. New claims 39-81 have been added.

Claim Objections

2. Claim 58 is objected to because of the following informalities: "submergin" should read "submerging" at line 6 of the claim. Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 18-19 and 21-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zimmermann (US 6465226) in view of Huang et al. (NPL document "Preparation and structure of silicon doped tin oxide composites using an advanced ultrasonic spray method".

Regarding claim 18, Zimmermann teaches a process for preparing microspheres comprising an ionically crosslinked polymer, the process comprising:

(a) producing liquid aerosol droplets from a solution comprising an ionically crosslinkable polyionic polymer into a gas stream comprising compressed air and the droplets by using a nebulzing nozzle;

(b) transferring the gas stream into a gelling solution comprising bivalent or trivalent ions, whereby crosslinked polymer microspheres are formed (abstract, col. 2, lines 65 to col. 3, lines 29, col. 6, lines 38-45, col. 7, lines 28-31).

Zimmermann does not positively characterize the gas stream as continuous. However, it is obvious that the gas stream is continuous since a constant airflow is needed to separate the droplets from the nozzle (abstract, col. 3, lines 8-15).

Zimmermann does not positively characterize a separating step of the microspheres from the gelling solution. However, it is inherent that the microspheres are separated from the gelling solution since Zimmermann teaches a dwell time of 10-15 minutes of the microspheres in the precipitation bath (col. 3, lines 24-29). Zimmermann does not teach using an ultrasonic nebulizer for forming the continuous gas stream.

However, Huang et al. teaches a process for preparation of a homogeneous, ultrafine powder by generating aerosol by an ultrasonic nebulizer. The precursor solution is atomized by the ultrasonic nebulizer, carried through the tubing to the nozzle by a carrier gas (air or oxygen) (see pages 205-206). It would have been obvious to one of ordinary skill in the art at the time of the invention to employ the ultrasonic mobilization method disclosed in Huang et al. in Zimmermann since Huang et al. teaches that atomizing a precursor solution by the ultrasonic nebulizer produces homogeneous, ultrafine powders having a particle size of about 100 nm (see pages 205-206).

Regarding claim 19, Zimmermann teaches that the ionically crosslinkable polymer is a polyanionic polymer and the gelling solution comprises a polyvalent cation (abstract, col. 4, lines 18-19, col. 6, lines 9-22 and 43-45).

Regarding claim 21, Zimmermann teaches that the ionically crosslinkable polymer is a polyanionic polymer and the gelling solution comprises di-, multi- or polyvalent cations (col. 4, lines 18-19 and col. 6, lines 38-45).

Regarding claims 22-24, Zimmermann teaches that the polyanionic polymer is alginate (abstract, col. 6, lines 9-21 and col. 7, lines 28-31), which is a salt of alginic acid.

Regarding claim 25, Zimmermann teaches that in step (a), the polyanionic polymer is present in a concentration of less than 5% by weight (col. 2, lines 56-63).

Regarding claims 26-27, Zimmermann teaches that the ion of the gelling solution is a metal cation such as Ba^{2+} and other bivalent cations (col. 6, lines 39-42).

5. Claims 20 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zimmermann in view of Huang et al. as applied to claim 19 above, and further in view of Lim (US 4,352,883).

Regarding claim 20, Zimmermann does not teach that the polyvalent cation of the gelling solution is selected from the group consisting of poly (allyalamine hydrochloride), poly (ethylene imine), poly (diallyldimethylammonium chloride), polyamide-polyamine-epichlorhydrine, chitosan, amino-dextran, and protamine sulfate.

However, Lim teaches that the polyvalent cation of the gelling solution is polyethyleneimine (col. 7, lines 59-64).

It would have been obvious to one of ordinary skill in the art at the time of the invention to select polyethyleneimine as the polyvalent cation in the gelling solution in the method of Zimmermann since Lim teaches that polysaccharide can be (a) gelled to form a shape retaining mass by being exposed to a change in conditions such a pH change or by being exposed to multivalent cations such as Ca^{++}; and (b) permanently “crosslinked” or hardened by polymers containing reactive groups such as amine or imine groups which can react with acidic polysaccharide constituents (col. 2, lines 37-46).

Regarding claim 28, Zimmermann teaches that the ion of the gelling solution is a metal cation such as Ba^{2+} and other bivalent cations.

Zimmermann does not positively teach that the metal cation of the gelling solution is Ca^{2+}.

However, Lim teaches that Ca^{2+} is used as the metal cation of the gelling solution (col. 2, lines 37-42.

It would have been obvious to one of ordinary skill in the art at the time of the invention to select Ca^{2+} as the metal cation of the gelling solution in the method of Zimmermann since Lim teaches that Ca^{2+} is a multivalent cation which forms crosslinked polymer microspheres with polysacharride (col. 2, lines 37-42). The Ca cation is viewed as functional equivalent, providing gel.

6. Claims 29-30, 32 and 35-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zimmermann in view of Huang et al. as applied to claim 18 above, and further in view of Andersson et al. (WO 03/091315).

Regarding claims 29-30 and 36, Zimmermann does not teach that the gelling solution additionally comprises a surfactant present in an amount of from 0.05 to .15% by weight.

However, Andersson et al. teach that droplets which form polysaccharide beads are collected in a bath comprised of a liquid having a reduced surface tension by adding a surfactant to the liquid (page 7, line25- page 8, line 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teaching of Andersson et al. in the method of Zimmermann to provide a surfactant in the gelling solution to facilitate movement of the beads in the solution.

Andersson et al. do not positively teach the amount of surfactant that is added, however, it would have been obvious to one of ordinary skill in the art to select an appropriate amount of surfactant to satisfactorily lower the surface tension of the solution. Additionally the amount of surfactant is known to affect particle size of the capsules.

Regarding claim 32 and 37, Zimmerman does not positively teach that the temperature of the solution of the ionically crosslinkable polyionic polymer according to step (a) is kept within a temperature of from 25 to 35 deg C. However, Andersson et al. teach the temperature of the polysaccharide solution should be kept low, such as below about 40 deg C (page 5, lines 2-4). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teaching of Andersson et al. in the method of Zimmermann since Andersson et al. teach that keeping the solution at a low temperature avoids formation of lumps (page 5, lines 2-4).

Regarding claim 35, Zimmerman does not teach filtering the microspheres through a screen.

However, Andersson et al. teach filtering the beads to a sieve 14 for particle concentration (page 13, line 5 and fig. 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the filtering step as taught by Andersson et al. in the method of Zimmermann in order to obtain microspheres with a more uniform size distribution.

7. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zimmerman in view of Huang et al. and Andersson et al. as applied to claim 29 above, and further in view of Lemoine et al. NPL document Preparation and characterization of alginate microspheres containing a model antigen).

Regarding claim 31, Andersson et al. do not positively teach that the surfactant is selected from the group consisting of polyoxyethylene sorbitans and surfactants comprising a block copolymer of ethylene oxide and/or propylene oxide.

However, Lemoine et al. teach the use of polyoxyethylene sorbitan trioleate as surfactant in the production of alginate microspheres (see section 2.1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use polyoxyethylene sorbitan trioleate as surfactant in the method of Zimmermann since Lemoine et al. teach that polyoxyethylene sorbitan trioleate, or Tween 85 produced less heterogeneous and smaller microspheres (table 1 and section 3.1). Surfactant of Lemoine is viewed as functional equivalent.

8. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zimmermann in view of Huang et al. as applied to claim 21 above, and further in view of Vasington et al. (US 5,387,522), Andersson et al. (WO 03/091315) and Lemoine et al. NPL document Preparation and characterization of alginate microspheres containing a model antigen).

Regarding claim 33, Zimmermann teaches that in step (a), the solution comprises about 2 % by weight sodium alginate (col. 2, lines 56-63). Zimmermann does not teach that the solution comprises of from 0.75% to 1.5% by weight of sodium alginate. Zimmermann does not positively teach that the sodium alginate is low viscosity.

However, Vasington et al. teach low viscosity sodium alginates that are used as the polyanionic polymer. Further, Vasington et al. teach that the concentration of the sodium alginates in the mixture should range from about 0.5 to about 1.4%, preferably about 0.6 to 1.2%, most preferably about 0.7-0.9% (col. 5, lines 17-51).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teaching of Vasington et al. in the method of Zimmerman et al. since Vasington et al. teach that low percentage of sodium alginate result in higher porosity of the gel beads to nutrients and other factors (col. 5, line 46-51). Moreover, lowering the viscosity of sodium alginates produces smaller microspheres. Zimmermann teaches that the ion of the gelling solution is a metal cation such as Ba^{2+} and other bivalent cations. Zimmermann does not positively teach that the metal cation of the gelling solution is Ca^{2+}. However, Vasington et al. teach that the cation in the gelling solution is Ca^{2+} (col. 6, lines 46-48, col. 7, lines 28-32 and col. 8, lines 42-47).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use Ca^{2+} as the cation in the gelling solution as taught by Vasington et al. since Vasington et al. teach that Ca^{2+} forms stable calcium alginate gel contating entrapped cells (col. 8, lines 42-47).

Zimmermann does not teach that the gelling solution additionally comprises a surfactant present in an amount of from 0.05 to .15% by weight.

However, Andersson et al. teach that droplets which form polysaccharide beads are collected in a bath comprised of a liquid having a reduced surface tension by adding a surfactant to the liquid (page 7, line25- page 8, line 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teaching of Andersson et al. in the method of Zimmermann to provide a surfactant in the gelling solution to facilitate movement of the beads in the solution.

Andersson et al. do not positively teach the amount of surfactant that is added, however, it would have been obvious to one of ordinary skill in the art to select an appropriate amount of surfactant to satisfactorily lower the surface tension of the solution. Andersson et al. do not positively teach that the surfactant is poly (oxyehtylen) 20-sorbitane monolaureate.

However, Lemoine et al. teach the use of polyoxyethylene sorbitan trioleate as surfactant in the production of alginate microspheres (see section 2.1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use polyoxyethylene sorbitan trioleate as surfactant in the method of Zimmermann since Lemoine et al. teach that polyoxyethylene sorbitan trioleate, or Tween 85 produced less heterogeneous and smaller microspheres (table 1 and section 3.1).

While Andersson et al. teach the use of polyoxyethylene sorbitan trioleate, as opposed to poly (oxyehtylene) 20-sorbitane monolaureate as recited in claim 33.

It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute polyoxyethylene sorbitan trioleate with poly (oxyethylene) 20-sorbitane monolaureate since both surfactants are structurally similar.

9. Claims 39-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zimmermann (US 6465226) in view of Huang et al. (NPL document “Preparation and structure of silicon doped tin oxide composites using an advanced ultrasonic spray method” and Lim (US 4,352,883).

Regarding claim 39, the claim is identical to claim 18 except for the additional limitation of "submerging the gas stream via a tubing comprising dispenser holes". This limitation is not taught by Zimmermann or Huang et al. However, Lim teaches a process for encapsulation of biological material by forcing the gum-nutrient-tissue suspension through a vibrating capillary tube 18 comprising a dispenser hole which has the capillary tip immersed in a solution of sodium alginate. Droplets ejected from the tip of the capillary immediately contact the solution and gel as spheroidal shaped bodies. The gelled capsules are then separated from the supernatant solution by aspiration (see col. 8, l. 38-44, col. 2, ln. 52-58, col. 9, ln. l-29, col. 6, ln. 10-34 and fig. 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to submerge the gas stream via a tubing comprising dispenser holes into a gelling solution of multivalent cation in the process of Zimmermann since Lim teaches that by immersing the capillary tube in the gelling solution, droplets ejected from the tip of the capillary immediately

contact the solution and gel, this results in "crosslinking" of the gel and in the formation of a shape-retaining, high viscosity protective temporary capsule containing the suspended tissue and its medium (see col. 6, ln. 29-34).

Regarding claim 40, Zimmermann teaches that the ionically crosslinkable polymer is a polyanionic polymer and the gelling solution comprises a polyvalent cation (abstract, col. 4, lines 18-19, col. 6, lines 9-22 and 43-45).

Regarding claim 41, Zimmermann does not teach that the polyvalent cation of the gelling solution is selected from the group consisting of poly (allyalamine hydrochloride), poly (ethylene imine), poly (diallyldimethylammonium chloride), polyamide-polyamine-epichlorhydrine, chitosan, amino-dextran, and protamine sulfate.

However, Lim teaches that the polyvalent cation of the gelling solution is polyethyleneimine (col. 7, lines 59-64).

It would have been obvious to one of ordinary skill in the art at the time of the invention to select polyethyleneimine as the polyvalent cation in the gelling solution in the method of Zimmermann since Lim teaches that polysaccharide can be (a) gelled to form a shape retaining mass by being exposed to a change in conditions such a pH change or by being exposed to multivalent cations such as Ca^{++}; and (b) permanently "crosslinked" or hardened by polymers containing reactive groups such as amine or imine groups which can react with acidic polysaccharide constituents (col. 2, lines 37-46).

Regarding claim 42, Zimmermann teaches that the ionically crosslinkable polymer is a polyanionic polymer and the gelling solution comprises di-, multi- or polyvalent cations (col. 4, lines 18-19 and col. 6, lines 38-45).

Regarding claims 43-45, Zimmermann teaches that the polyanionic polymer is alginate (abstract, col. 6, lines 9-21 and col. 7, lines 28-31), which is a salt of alginic acid.

Regarding claim 46, Zimmermann teaches that in step (a), the polyanionic polymer is present in a concentration of less than 5% by weight (col. 2, lines 56-63).

Regarding claim 47-48, Zimmermann teaches that the ion of the gelling solution is a metal cation such as Ba^{2+} and other bivalent cations (col. 6, lines 39-42).

Regarding claim 49, Zimmermann teaches that the ion of the gelling solution is a metal cation such as Ba^{2+} and other bivalent cations.

Zimmermann does not positively teach that the metal cation of the gelling solution is Ca^{2+}.

However, Lim teaches that Ca^{2+} is used as the metal cation of the gelling solution (col. 2, lines 37-42.

It would have been obvious to one of ordinary skill in the art at the time of the invention to select Ca^{2+} as the metal cation of the gelling solution in the method of Zimmermann since Lim teaches that Ca^{2+} is a multivalent cation which forms crosslinked polymer microspheres with polysacharride (col. 2, lines 37-42). The Ca cation is viewed as functional equivalent, providing gel.

10. Claim 50-51, 53 and 55-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zimmermann in view of Huang et al. and Lim as applied to claim 39 above, and further in view of Andersson et al. (WO 03/091315).

Regarding claims 50-51 and 56, Zimmermann does not teach that the gelling solution additionally comprises a surfactant present in an amount of from 0.05 to .15% by weight.

However, Andersson et al. teach that droplets which form polysaccharide beads are collected in a bath comprised of a liquid having a reduced surface tension by adding a surfactant to the liquid (page 7, line25- page 8, line 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teaching of Andersson et al. in the method of Zimmermann to provide a surfactant in the gelling solution to facilitate movement of the beads in the solution.

Andersson et al. do not positively teach the amount of surfactant that is added, however, it would have been obvious to one of ordinary skill in the art to select an appropriate amount of surfactant to satisfactorily lower the surface tension of the solution. Additionally the amount of surfactant is known to affect particle size of the capsules.

Regarding claim 53 and 57, Zimmerman does not positively teach that the temperature of the solution of the ionically crosslinkable polyionic polymer according to step (a) is kept within a temperature of from 25 to 35 deg C. However, Andersson et al. teach the temperature of the polysaccharide solution should be kept low, such as below about 40 deg C (page 5, lines 2-4). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teaching of Andersson et al. in the method of Zimmermann since Andersson et al. teach that keeping the solution at a low temperature avoids formation of lumps (page 5, lines 2-4).

Regarding claim 55, Zimmerman does not teach filtering the microspheres through a screen.

However, Andersson et al. teach filtering the beads to a sieve 14 for particle concentration (page 13, line 5 and fig. 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the filtering step as taught by Andersson et al. in the method of Zimmermann in order to obtain microspheres with a more uniform size distribution.

11. Claim 52 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zimmerman in view of Huang et al., Lim and Andersson et al. as applied to claim 50 above, and further in view of Lemoine et al. NPL document Preparation and characterization of alginate microspheres containing a model antigen).

Regarding claim 52, Andersson et al. do not positively teach that the surfactant is selected from the group consisting of polyoxyethylene sorbitans and surfactants comprising a block copolymer of ethylene oxide and/or propylene oxide.

However, Lemoine et al. teach the use of polyoxyethylene sorbitan trioleate as surfactant in the production of alginate microspheres (see section 2.1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use polyoxyethylene sorbitan trioleate as surfactant in the method of Zimmermann since Lemoine et al. teach that polyoxyethylene sorbitan trioleate, or Tween 85 produced less heterogeneous and smaller microspheres (table 1 and section 3.1). Surfactant of Lemoine is viewed as functional equivalent.

12. Claim 54 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zimmermann in view of Huang et al. and Lim as applied to claim 42 above, and further in view of Vasington et al. (US 5,387,522), Andersson et al. (WO 03/091315) and Lemoine et al. NPL document Preparation and characterization of alginate microspheres containing a model antigen).

Regarding claim 54, Zimmermann teaches that in step (a), the solution comprises about 2 % by weight sodium alginate (col. 2, lines 56-63). Zimmermann does not teach that the solution comprises of from 0.75% to 1.5% by weight of sodium alginate. Zimmermann does not positively teach that the sodium alginate is low viscosity.

However, Vasington et al. teach low viscosity sodium alginates that are used as the polyanionic polymer. Further, Vasington et al. teach that the concentration of the sodium alginates in the mixture should range from about 0.5 to about 1.4%, preferably about 0.6 to 1.2%, most preferably about 0.7-0.9% (col. 5, lines 17-51).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teaching of Vasington et al. in the method of Zimmerman et al. since Vasington et al. teach that low percentage of sodium alginate result in higher porosity of the gel beads to nutrients and other factors (col. 5, line 46-51). Moreover, lowering the viscosity of sodium alginates produces smaller microspheres. Zimmermann teaches that the ion of the gelling solution is a metal cation such as Ba^{2+} and other bivalent cations. Zimmermann does not positively teach that the metal cation of the gelling solution is Ca^{2+}. However, Vasington et al. teach that the cation in the gelling solution is Ca^{2+} (col. 6, lines 46-48, col. 7, lines 28-32 and col. 8, lines 42-47).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use Ca^{2+} as the cation in the gelling solution as taught by Vasington et al. since Vasington et al. teach that Ca^{2+} forms stable calcium alginate gel contating entrapped cells (col. 8, lines 42-47).

Zimmermann does not teach that the gelling solution additionally comprises a surfactant present in an amount of from 0.05 to .15% by weight.

However, Andersson et al. teach that droplets which form polysaccharide beads are collected in a bath comprised of a liquid having a reduced surface tension by adding a surfactant to the liquid (page 7, line25- page 8, line 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teaching of Andersson et al. in the method of Zimmermann to provide a surfactant in the gelling solution to facilitate movement of the beads in the solution.

Andersson et al. do not positively teach the amount of surfactant that is added, however, it would have been obvious to one of ordinary skill in the art to select an appropriate amount of surfactant to satisfactorily lower the surface tension of the solution. Andersson et al. do not positively teach that the surfactant is poly (oxyehtylen) 20-sorbitane monolaureate.

However, Lemoine et al. teach the use of polyoxyethylene sorbitan trioleate as surfactant in the production of alginate microspheres (see section 2.1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use polyoxyethylene sorbitan trioleate as surfactant in the method of Zimmermann since Lemoine et al. teach that polyoxyethylene sorbitan trioleate, or Tween 85 produced less heterogeneous and smaller microspheres (table 1 and section 3.1).

While Andersson et al. teach the use of polyoxyethylene sorbitan trioleate, as opposed to poly (oxyehtylene) 20-sorbitane monolaureate as recited in claim 54.

It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute polyoxyethylene sorbitan trioleate with poly (oxyethylene) 20-sorbitane monolaureate since both surfactants are structurally similar.

13. Claims 58-64 and 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zimmermann (US 6465226) in view of Huang et al. (NPL document “Preparation and structure of silicon doped tin oxide composites using an advanced ultrasonic spray method”), Lim (US 4,352,883), Andersson et al. (WO 03/091315) and Lemoine et al. NPL document Preparation and characterization of alginate microspheres containing a model antigen).

Regarding claims 58-61 and 64, Zimmermann teaches a process for preparing microspheres comprising an ionically crossslinked polymer, the process comprising:

(a) producing liquid aerosol droplets from a solution comprising an ionically crosslinkable polyionic polymer into a gas stream comprising compressed air and the droplets by using a nebulzing nozzle;

(b) passing the gas stream into a gelling solution comprising bivalent or trivalent ions, whereby crosslinked polymer microspheres are formed (abstract, col. 2, lines 65 to col. 3, lines 29, col. 6, lines 38-45, col. 7, lines 28-31).

Zimmermann does not positively characterize the gas stream as continuous. However, it is obvious that the gas stream is continuous since a constant airflow is needed to separate the droplets from the nozzle (abstract, col. 3, lines 8-15).

Zimmermann does not positively characterize a separating step of the microspheres from the gelling solution. However, it is inherent that the microspheres are separated from the gelling solution since Zimmermann teaches a dwell time of 10-15 minutes of the microspheres in the

precipitation bath (col. 3, lines 24-29). Zimmermann does not teach using an ultrasonic nebulizer for forming the continuous gas stream.

However, Huang et al. teaches a process for preparation of a homogeneous, ultrafine powder by generating aerosol by an ultrasonic nebulizer. The precursor solution is atomized by the ultrasonic nebulizer, carried through the tubing to the nozzle by a carrier gas (air or oxygen) (see pages 205-206). It would have been obvious to one of ordinary skill in the art at the time of the invention to employ the ultrasonic mobilization method disclosed in Huang et al. in Zimmermann since Huang et al. teaches that atomizing a precursor solution by the ultrasonic nebulizer produces homogeneous, ultrafine powders having a particle size of about 100 nm (see pages 205-206).

Zimmermann does not teach that the gas stream is submerged into the gelling solution. However, Lim teaches a process for encapsulation of biological material by forcing the gum-nutrient-tissue suspension through a vibrating capillary tube 18 comprising a dispenser hole which has the capillary tip immersed in a solution of sodium alginate. Droplets ejected from the tip of the capillary immediately contact the solution and gel as spheroidal shaped bodies. The gelled capsules are then separated from the supernatant solution by aspiration (see col. 8, l. 38-44, col. 2, ln. 52-58, col. 9, ln. 1-29, col. 6, ln. 10-34 and fig. 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to submerge the gas stream into a gelling solution of multivalent cation in the process of Zimmermann since Lim teaches that by immersing the capillary tube in the gelling solution, droplets ejected from the tip of the capillary immediately contact the solution and gel, this results in “crosslinking” of the gel and in the

formation of a shape-retaining, high viscosity protective temporary capsule containing the suspended tissue and its medium (see col. 6, ln. 29-34).

Zimmermann teaches that the ion of the gelling solution is a metal cation such as Ba^{2+} and other bivalent cations.

Zimmermann does not positively teach that the metal cation of the gelling solution is Ca^{2+}.

However, Lim teaches that Ca^{2+} is used as the metal cation of the gelling solution (col. 2, lines 37-42.

It would have been obvious to one of ordinary skill in the art at the time of the invention to select Ca^{2+} as the metal cation of the gelling solution in the method of Zimmermann since Lim teaches that Ca^{2+} is a multivalent cation which forms crosslinked polymer microspheres with polysacharride (col. 2, lines 37-42). The Ca cation is viewed as functional equivalent, providing gel.

Zimmermann does not teach that the gelling solution additionally comprises a surfactant present in an amount of from 0.05 to .15% by weight.

However, Andersson et al. teach that droplets which form polysaccharide beads are collected in a bath comprised of a liquid having a reduced surface tension by adding a surfactant to the liquid (page 7, line25- page 8, line 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teaching of Andersson et al. in the method of Zimmermann to provide a surfactant in the gelling solution to facilitate movement of the beads in the solution.

Andersson et al. do not positively teach the amount of surfactant that is added, however, it would have been obvious to one of ordinary skill in the art to select an appropriate amount of surfactant to satisfactorily lower the surface tension of the solution. Andersson et al. do not positively teach that the surfactant is poly (oxyehtylen) 20-sorbitane monolaureate.

However, Lemoine et al. teach the use of polyoxyethylene sorbitan trioleate as surfactant in the production of alginate microspheres (see section 2.1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use polyoxyethylene sorbitan trioleate as surfactant in the method of Zimmermann since Lemoine et al. teach that polyoxyethylene sorbitan trioleate, or Tween 85 produced less heterogeneous and smaller microspheres (table 1 and section 3.1).

While Andersson et al. teach the use of polyoxyethylene sorbitan trioleate, as opposed to poly (oxyehtylene) 20-sorbitane monolaureate as recited in claim 58; it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute polyoxyethylene sorbitan trioleate with poly (oxyethylene) 20-sorbitane monolaureate since both surfactants are structurally similar.

Regarding claim 62 and 65, Zimmerman does not positively teach that the temperature of the solution of the ionically crosslinkable polyionic polymer according to step (a) is kept within a temperature of from 25 to 35 deg C. However, Andersson et al. teach the temperature of the polysaccharide solution should be kept low, such as below about 40 deg C (page 5, lines 2-4). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teaching of Andersson et al. in the method of Zimmermann since Andersson et

al. teach that keeping the solution at a low temperature avoids formation of lumps (page 5, lines 2-4).

Regarding claim 62 and 65, Zimmerman does not positively teach that the temperature of the solution of the ionically crosslinkable polyionic polymer according to step (a) is kept within a temperature of from 25 to 35 deg C. However, Andersson et al. teach the temperature of the polysaccharide solution should be kept low, such as below about 40 deg C (page 5, lines 2-4). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teaching of Andersson et al. in the method of Zimmermann since Andersson et al. teach that keeping the solution at a low temperature avoids formation of lumps (page 5, lines 2-4).

Regarding claim 63, Zimmerman does not teach filtering the microspheres through a screen.

However, Andersson et al. teach filtering the beads to a sieve 14 for particle concentration (page 13, line 5 and fig. 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to provide the filtering step as taught by Andersson et al. in the method of Zimmermann in order to obtain microspheres with a more uniform size distribution.

14. Claims 66-78 and 81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zimmermann (US 6465226) in view of Huang et al. (NPL document “Preparation and structure of silicon doped tin oxide composites using an advanced ultrasonic spray method”), Lim (US 4,352,883), and Andersson et al. (WO 03/091315).

Regarding claim 66, Zimmermann teaches a process for preparing microspheres comprising an ionically crossslinked polymer, the process comprising:

(a) producing liquid aerosol droplets from a solution comprising an ionically crosslinkable polyionic polymer into a gas stream comprising compressed air and the droplets by using a nebulzing nozzle;

(b) passing the gas stream into a gelling solution comprising bivalent or trivalent ions, whereby crosslinked polymer microspheres are formed (abstract, col. 2, lines 65 to col. 3, lines 29, col. 6, lines 38-45, col. 7, lines 28-31).

Zimmermann does not positively characterize the gas stream as continuous. However, it is obvious that the gas stream is continuous since a constant airflow is needed to separate the droplets from the nozzle (abstract, col. 3, lines 8-15).

Zimmermann does not positively characterize a separating step of the microspheres from the gelling solution. However, it is inherent that the microspheres are separated from the gelling solution since Zimmermann teaches a dwell time of 10-15 minutes of the microspheres in the precipitation bath (col. 3, lines 24-29). Zimmermann does not teach using an ultrasonic nebulizer for forming the continuous gas stream.

However, Huang et al. teaches a process for preparation of a homogeneous, ultrafine powder by generating aerosol by an ultrasonic nebulizer. The precursor solution is atomized by the ultrasonic nebulizer, carried through the tubing to the nozzle by a carrier gas (air or oxygen) (see pages 205-206). It would have been obvious to one of ordinary skill in the art at the time of the invention to employ the ultrasonic mobilization method disclosed in Huang et al. in Zimmermann since Huang et al. teaches that atomizing a precursor solution by the ultrasonic

nebulizer produces homogeneous, ultrafine powders having a particle size of about 100 nm (see pages 205-206).

Zimmermann does not teach that the gas stream is submerged into the gelling solution. However, Lim teaches a process for encapsulation of biological material by forcing the gum-nutrient-tissue suspension through a vibrating capillary tube 18 comprising a dispenser hole which has the capillary tip immersed in a solution of sodium alginate. Droplets ejected from the tip of the capillary immediately contact the solution and gel as spheroidal shaped bodies. The gelled capsules are then separated from the supernatant solution by aspiration (see col. 8, l. 38-44, col. 2, ln. 52-58, col. 9, ln. 1-29, col. 6, ln. 10-34 and fig. 1). It would have been obvious to one of ordinary skill in the art at the time of the invention to submerge the gas stream into a gelling solution of multivalent cation in the process of Zimmermann since Lim teaches that by immersing the capillary tube in the gelling solution, droplets ejected from the tip of the capillary immediately contact the solution and gel, this results in "crosslinking" of the gel and in the formation of a shape-retaining, high viscosity protective temporary capsule containing the suspended tissue and its medium (see col. 6, ln. 29-34).

Zimmerman does not positively teach that the temperature of the solution of the ionically crosslinkable polyionic polymer according to step (a) is kept within a temperature of from 25 to 35 deg C. However, Andersson et al. teach the temperature of the polysaccharide solution should be kept low, such as below about 40 deg C (page 5, lines 2-4). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teaching of Andersson et al. in the method of Zimmermann since Andersson et al. teach that keeping the solution at a low temperature avoids formation of lumps (page 5, lines 2-4).

Regarding claim 67, Zimmermann teaches that the ionically crosslinkable polymer is a polyanionic polymer and the gelling solution comprises a polyvalent cation (abstract, col. 4, lines 18-19, col. 6, lines 9-22 and 43-45).

Regarding claim 68, Zimmermann does not teach that the polyvalent cation of the gelling solution is selected from the group consisting of poly (allyalamine hydrochloride), poly (ethylene imine), poly (diallyldimethylammonium chloride), polyamide-polyamine-epichlorhydrine, chitosan, amino-dextran, and protamine sulfate.

However, Lim teaches that the polyvalent cation of the gelling solution is polyethyleneimine (col. 7, lines 59-64).

It would have been obvious to one of ordinary skill in the art at the time of the invention to select polyethyleneimine as the polyvalent cation in the gelling solution in the method of Zimmermann since Lim teaches that polysaccharide can be (a) gelled to form a shape retaining mass by being exposed to a change in conditions such a pH change or by being exposed to multivalent cations such as Ca^{++}; and (b) permanently "crosslinked" or hardened by polymers containing reactive groups such as amine or imine groups which can react with acidic polysaccharide constituents (col. 2, lines 37-46).

Regarding claim 69, Zimmermann teaches that the ionically crosslinkable polymer is a polyanionic polymer and the gelling solution comprises di-, multi- or polyvalent cations (col. 4, lines 18-19 and col. 6, lines 38-45).

Regarding claims 70-72, Zimmermann teaches that the polyanionic polymer is alginate (abstract, col. 6, lines 9-21 and col. 7, lines 28-31), which is a salt of alginic acid.

Regarding claim 73, Zimmermann teaches that in step (a), the polyanionic polymer is present in a concentration of less than 5% by weight (col. 2, lines 56-63).

Regarding claims 74-75, Zimmermann teaches that the ion of the gelling solution is a metal cation such as Ba^{2+} and other bivalent cations (col. 6, lines 39-42).

Regarding claim 76, Zimmermann teaches that the ion of the gelling solution is a metal cation such as Ba^{2+} and other bivalent cations.

Zimmermann does not positively teach that the metal cation of the gelling solution is Ca^{2+}.

However, Lim teaches that Ca^{2+} is used as the metal cation of the gelling solution (col. 2, lines 37-42.

It would have been obvious to one of ordinary skill in the art at the time of the invention to select Ca^{2+} as the metal cation of the gelling solution in the method of Zimmermann since Lim teaches that Ca^{2+} is a multivalent cation which forms crosslinked polymer microspheres with polysacharride (col. 2, lines 37-42). The Ca cation is viewed as functional equivalent, providing gel.

Regarding claims 77-78, Zimmermann does not teach that the gelling solution additionally comprises a surfactant present in an amount of from 0.05 to .15% by weight.

However, Andersson et al. teach that droplets which form polysaccharide beads are collected in a bath comprised of a liquid having a reduced surface tension by adding a surfactant to the liquid (page 7, line25- page 8, line 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teaching of Andersson et al. in the method of Zimmermann to provide a surfactant in the gelling solution to facilitate movement of the beads in the solution.

Andersson et al. do not positively teach the amount of surfactant that is added, however, it would have been obvious to one of ordinary skill in the art to select an appropriate amount of surfactant to satisfactorily lower the surface tension of the solution. Additionally the amount of surfactant is known to affect particle size of the capsules.

Regarding claim 81, Zimmerman does not positively teach that the temperature of the solution of the ionically crosslinkable polyionic polymer according to step (a) is kept within a temperature of from 25 to 35 deg C. However, Andersson et al. teach the temperature of the polysaccharide solution should be kept low, such as below about 40 deg C (page 5, lines 2-4). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teaching of Andersson et al. in the method of Zimmermann since Andersson et al. teach that keeping the solution at a low temperature avoids formation of lumps (page 5, lines 2-4).

15. Claim 79 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zimmerman in view of Huang et al., Lim and Andersson et al. as applied to claim 77 above, and further in view of Lemoine et al. NPL document Preparation and characterization of alginate microspheres containing a model antigen).

Regarding claim 79, Andersson et al. do not positively teach that the surfactant is selected from the group consisting of polyoxyethylene sorbitans and surfactants comprising a block copolymer of ethylene oxide and/or propylene oxide.

However, Lemoine et al. teach the use of polyoxyethylene sorbitan trioleate as surfactant in the production of alginate microspheres (see section 2.1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use polyoxyethylene sorbitan trioleate as surfactant in the method of Zimmermann since Lemoine et al. teach that polyoxyethylene sorbitan trioleate, or Tween 85 produced less heterogeneous and smaller microspheres (table 1 and section 3.1). Surfactant of Lemoine is viewed as functional equivalent.

16. Claim 80 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zimmermann in view of Huang et al., Lim in view of Andersson et al. as applied to claim 69 above, and further in view of Vasington et al. (US 5,387,522), and Lemoine et al. NPL document Preparation and characterization of alginate microspheres containing a model antigen).

Regarding claim 80, Zimmermann teaches that in step (a), the solution comprises about 2 % by weight sodium alginate (col. 2, lines 56-63). Zimmermann does not teach that the solution comprises of from 0.75% to 1.5% by weight of sodium alginate. Zimmermann does not positively teach that the sodium alginate is low viscosity.

However, Vasington et al. teach low viscosity sodium alginates that are used as the polyanionic polymer. Further, Vasington et al. teach that the concentration of the sodium alginates in the mixture should range from about 0.5 to about 1.4%, preferably about 0.6 to 1.2%, most preferably about 0.7-0.9% (col. 5, lines 17-51).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teaching of Vasington et al. in the method of Zimmerman et al. since Vasington et al. teach that low percentage of sodium alginate result in higher porosity of the gel

beads to nutrients and other factors (col. 5, line 46-51). Moreover, lowering the viscosity of sodium alginates produces smaller microspheres. Zimmermann teaches that the ion of the gelling solution is a metal cation such as Ba^{2+} and other bivalent cations. Zimmermann does not positively teach that the metal cation of the gelling solution is Ca^{2+}. However, Vasington et al. teach that the cation in the gelling solution is Ca^{2+} (col. 6, lines 46-48, col. 7, lines 28-32 and col. 8, lines 42-47).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use Ca^{2+} as the cation in the gelling solution as taught by Vasington et al. since Vasington et al. teach that Ca^{2+} forms stable calcium alginate gel contating entrapped cells (col. 8, lines 42-47).

Zimmermann does not teach that the gelling solution additionally comprises a surfactant present in an amount of from 0.05 to .15% by weight.

However, Andersson et al. teach that droplets which form polysaccharide beads are collected in a bath comprised of a liquid having a reduced surface tension by adding a surfactant to the liquid (page 7, line25- page 8, line 1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teaching of Andersson et al. in the method of Zimmermann to provide a surfactant in the gelling solution to facilitate movement of the beads in the solution.

Andersson et al. do not positively teach the amount of surfactant that is added, however, it would have been obvious to one of ordinary skill in the art to select an appropriate amount of surfactant to satisfactorily lower the surface tension of the solution. Andersson et al. do not positively teach that the surfactant is poly (oxyehtylen) 20-sorbitane monolaureate.

However, Lemoine et al. teach the use of polyoxyethylene sorbitan trioleate as surfactant in the production of alginate microspheres (see section 2.1).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use polyoxyethylene sorbitan trioleate as surfactant in the method of Zimmermann since Lemoine et al. teach that polyoxyethylene sorbitan trioleate, or Tween 85 produced less heterogeneous and smaller microspheres (table 1 and section 3.1).

While Andersson et al. teach the use of polyoxyethylene sorbitan trioleate, as opposed to poly (oxyehtylene) 20-sorbitane monolaureate as recited in claim 33.

It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute polyoxyethylene sorbitan trioleate with poly (oxyethylene) 20-sorbitane monolaureate since both surfactants are structurally similar.

Response to Arguments

17. Applicant's arguments filed 11/8/10 have been fully considered but they are not persuasive. Applicant's arguments are based on the following reasons: A) the combination of Zimmermann and Huang does not disclose the present claims; B) there is no reasonable expectation of success in combining Zimmermann and Huang; and C) Huang would render Zimmermann unsatisfactory for its intended purpose.

18. Regarding A, applicant argues that dropping the droplets from the nozzle of Zimmermann into the gelling solution is not the same as “transferring the gas stream into” the gelling solution since the claim requires that the gas stream enter into the gelling solution, rather than simply allow droplets in the gas stream to drop onto the surface of the gelling solution, as set forth in Zimmermann. However, claim 18 does not specify how the gas stream is

"transferred" into the gelling solution. Applicant argues that simply dropping nebulized droplets onto the surface of a gelling solution does not actually allow the nebulized droplets to enter the gelling solution since simply dropping droplets via nebulization onto the surface of a gelling solution results in a mist of droplets that would most likely simply float above the surface of the liquid or produce a film on top of the gelling solution. However, it would have been obvious to one of ordinary skill in the art at the time of the invention that transferring the gas stream into a gelling solution would also include dropping droplets onto the surface of a gelling solution. Furthermore, even if the droplets merely float above the surface of the liquid or produce a film on top of the gelling solution, the droplets are still in contact of the gelling solution. It is noted that claim 18 does not exclude formation of the polymer microspheres on the surface of the gelling solution.

19. Regarding B, applicant argues that there is no reasonable expectation of success in combining Zimmermann and Huang to produce droplets of Langerhans having the requisite diameter of 1.5 to 4 times the volume of the core of biologically active material. However, Zimmermann teaches that the core material usually comprises living cells, but also dead ones, or dispersed active substances. The term "active substance" is defined to be understood generally and encompass all conceivable types of chemical compounds that show biological action (see col. 6, ln. 22-37). Therefore, Zimmermann is not restricted to encapsulation of islets of Langerhans but also other active substances. It would have been obvious to one of ordinary skill in the art at the time of the invention that the combination of Zimmermann and Huang is likely to produce droplets of biologically active substance of the required size since Zimmermann teaches that the core volume is specified by the starting material (see col. 2, ln. 28-29).

20. Finally, regarding argument C, applicant argues that Zimmermann cannot be modified with the disclosure of Huang since such modification would render Zimmermann unsatisfactory for its intended purpose. Applicant refers to the NPL document of Parry et al. to point out that application of ultrasound disrupts the islets of Langerhans and therefore one of ordinary skill in the art at the time of the invention would not have found it obvious to utilize the ultrasonic nebulizer of Huang in the methods of Zimmermann since ultrasound is shown to destroy islets of Langerhans and their enzymic machinery. Applicant concludes that as Zimmermann is directed to methods of encapsulating active cells (i.e., intact, enzymically active), such modification would clearly render Zimmermann unsatisfactory for its intended purpose. However, as explained above in paragraph 19, Zimmermann teaches that the core material comprises dead cells and also all types of chemical compounds that show biological action and not just islets of Langerhans. It would have been obvious to one of ordinary skill in the art at the time of the invention that exposing the core material such as a dead cell or other active substances which are not islets of Langerhans to ultrasound would not render Zimmermann unsatisfactory for its intended purpose since Zimmermann does not require the cells to be intact. In fact Zimmerman indicates that the core material may be dispersed active substances.

Conclusion

21. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to XUE LIU whose telephone number is (571)270-5522. The examiner can normally be reached on Monday to Friday 9:30 - 6:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Christina Johnson can be reached on (571)272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/X. L./

Examiner, Art Unit 1742
/Christina Johnson/

Supervisory Patent Examiner, Art Unit 1742